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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/607,789	06/30/2000	Kyeong-Jun Kim	678-506 (P9382)	1168

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Paul J Farrell Esq
Dilworth & Barrese
333 Earle Ovington Blvd
Uniondale, NY 11553

EXAMINER
CHOW, CHARLES CHIANG

ART UNIT	PAPER NUMBER
2684	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/607,789	Applicant(s) KIM ET AL.	
	Examiner Charles Chow	Art Unit 2684	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 July 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *6/30/2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Detailed Action

Priority

1. It is acknowledged that this application claims the benefit of the foreign priorities, Korea 26,672/1999 and Korea 38,777/1999.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takei (US 5,585,807) in view of Saldell (US 5,661,495), and further in view of Phillips et al. (US 5,572,223).

Regarding **claim 1**, Takei discloses a portable radio terminal apparatus including a terminal body and an antenna (small portable mobile terminal, abstract, col. 1, lines 11-20), wherein the portable radio terminal's overall length is less than ½ wavelength (the portable mobile terminal has overall length under ¼ wavelength in col. 1, lines 6-9). Takei discloses a small antenna, figure in cover page, for improving the signal loss using step conductor, strip conductor, finite ground (col. 2, lines 41-45, and his claims 1-5).

Takei does not clearly indicate the conductor, the printed circuit board, within portable radio terminal, such that the electrical length, of the portable radio terminal, is ½ wavelength.

Saldell teaches a conductor and a printed circuit board disposed within the terminal body such that an electrical equivalent length of the portable radio terminal is ½ wavelength (figure in cover page, abstract, a small size portable equipment, having quarter wavelength 1/4λ antenna radiator 1 and conductor 21 on board 20 in Fig. 3/Fig. 4). The conductor 21 is within the housing of the portable equipment. Saldell teaches the small quarter wavelength antenna could be functioning (col. 2, lines 8-30), by using the extended mirror current in conductor 21 on the tune ground plane, such that the antenna's electrical wavelength could be extended by the conductor 21. Saldell teaches the tune ground plane could be a flexible board or a conductive pattern integrated in the chassis or a circuit board for extending the antenna mirror current (col. 2 lines 46-53; col. 4, line 62 to col. 5, line 7). It is obvious to include Saldell's ¼ λ antenna and the extended mirror current in the tune ground conductor 21, to Takei's small terminal of ¼ λ size, such that the antenna could be functioning by directing the mirror current to the extended conductor 21, for the equivalent antenna electrical length of ½ wavelength. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify and include Saldell's ¼ λ antenna and the extended mirror current in conductor 21, to Takei's small terminal of ¼ λ size, such that the ¼ λ antenna could be functioning by directing the mirror current to the extended conductor 21, for a equivalent antenna electrical length of ½ wavelength.

In the above, it does not clearly indicate the conductor connected to the printed circuit board. Phillips teaches the conductor connected to the printed circuit board for high antenna performance (In Fig. 23, the patch radiator 1601 is a conductor which is connected to the

board 314 through ground pins 1969, at the ground plane 1666; col. 8, lines 41-43; col. 8, line 62 to col. 9, line 9). Phillips teaches the different shaped parasitic radiators (Fig. 7-12) which couples to the flap antenna for high antenna performance for a small pocket size antenna (abstract, col. 1, lines 26-31; col. 1, line 65 to col. 2, line 2; col. 7, lines 36-52; col. 3, lines 29-43; and in his claim 1). It would be obvious, if not inherent, to include Phillips' technique for high performance small antenna having parasitic radiator connected to board 314, to Takei as modified above, such that the antenna performance could be improved with parasitic radiator. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify and include Phillips' parasitic radiator connected to the board, to Takei as modified above, such that the antenna performance could be improved with parasitic radiator.

3. Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takei in view of Saldell, Phillips, and further in view of Egashira (US 5,262,792).

In the above, it does not clearly indicate the flat conductive board.

Regarding **claim 2**, Egashira teaches the flat conductive board for shortening the antenna for providing an ultrashort antenna of 37 millimeter mm for a wireless phone (abstract, figure in cover page; Fig. 8(a); col. 1, lines 8-17; col. 4, lines 43-50), using flat conductive board such as first flat metal member 20 and second metal member 30 (col. 2, lines 17-60; col. 6, lines 58-63). Egashira provides the solution for shortening the antenna using the flat metal conductive board member 20, 30. It is [illegible] obvious to include Egashira's flat

conductive member to reduce the antenna length, to Takei as modified above, such that the antenna could be shorten to small size, for easy carrying by user. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify and include Egashira's flat conductive member to reduce the antenna length, to Takei as modified above, such that the antenna could be shorten to small size, for easy carrying by user.

Regarding **claim 3**, referring to the examiner's comment in claim 1 above, Phillips has shown above in Fig. 21, 22, the parasitic radiator 1668 is a thin conducive element on the dielectric 1667 having ground plane 1666 (col. 8, lines 39-54). The thin conductive element on the dielectric layer having ground is applicant's claimed strip line.

Regarding **claim 4**, Phillips has shown above in claim 1, the conductor extending in a straight line from board 314 via ground pins 1969, as shown in Fig. 23, the quarter wavelength parasitic patch radiator 1601 which is a straight line. Phillips also shown the straight line in Fig. 19, Fig. 20.

Regarding **claim 5**, referring to the examiner's comment in claim 1 above, Phillips has shown the closed loop conductor 1200 in Fig. 12, col. 7, lines 36-52.

4. Claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takei in view of Saldell, Phillips, and further in view of Chatzipetros (US 5,554,996).

In the above, it does not clearly indicate the conductor integrated with the flip.

Regarding **claim 6**, Chatzipetros teaches the conductor (parasitic radiation 116) is integrated with the flip for providing antenna diversity (flap 104, figure in cover page, abstract). Chatzipetros teaches the parasitic 116, in flap 104, is inductively coupled to second antenna 202 (col. 2, line 62 to col. 3, line 4) for a small handset (co. 1, lines 12-15) for easy assembling and low cost (col. 1, lines 41-48; col. 2, lines 34-40; col. 2, line 62 to col. 67). It would be obvious to include Chatzipetros's parasitic radiator for providing antenna diversity when flap is either open or closed, to Takei as modified above, such that a handset could be upgraded of having the antenna diversity by using Chatzipetros's parasitic radiator in the flap. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify and include Chatzipetros's parasitic radiator for providing antenna diversity, to Takei as modified above, such that a handset could be upgraded of having the antenna diversity by using Chatzipetros's parasitic radiator in the flap. Besides, Regarding the equivalent electrical length formed by terminal body, the antenna and the flip is longer than ¼ wavelength thereby dispersing a peak current distribution point, Phillips has shown above in claim 1, in Fig. 10, the L-shaped parasitic radiator 1070, 1072, having one wavelength for coupling the high, maximum, antenna current, such that the peak current is dispersed by coupling distribution to the parasitic radiator 1070, 1072.

Regarding **claim 7**, referring to the examiner's comment in claim 6 above, Chatzipetros has shown above the conductive is inserted within a flip, by imbedding the conductive material into the plastic flap 104 (col. 2, lines 34-40).

Regarding **claim 8**, referring to the examiner's comment in claim 6 above, Chatzipetros has shown above the conductive paint for the parasitic radiator 116 (col. 2, lines 62-67) for applicant's claimed conductive pigments.

Regarding **claim 9**, Chatzipetros has shown above the parasitic radiator 116 is a conductive copper sticker tape to flap 104 (col. 2, lines 62-67).

Regarding **claim 10**, referring to the examiner's comment in claims 1, 2, 6 above, which also provides the claimed features for the conductor integrated with the flip of the portable radio terminal from Chatzipetros; the equivalent ground length formed by terminal body, the antenna, the flip is ½ wavelength from Phillips, and the dispersing the peak current distribution from Phillips.

Conclusion

5. In the above disclosure, Takei discloses a small portable mobile terminal including a body and an antenna the overall length is under ¼ wavelength. Takei discloses a small antenna for improving the signal loss using step conductor, strip conductor, finite ground. Saldell teaches the ¼ λ antenna and the extended mirror current in the tune ground conductor 21, such that the antenna could be functioning by directing the mirror current to the extended conductor 21, for the equivalent antenna electrical length of ½ wavelength. Phillips teaches the parasitic radiator conductor connected to the board to improve the antenna performance, the closes loop conductor, the coupling of the high antenna current for dispersing. Egashira teaches the flat conductive member to reduce the antenna length such that the antenna could be shorten to small size, for easy carrying by user. Chazipetros teaches the parasitic radiator for providing antenna diversity such that a handset could be upgraded of having the antenna

diversity by using the parasitic radiator in the flap. Chazipetros teaches the conductive paint, the copper tape for the parasitic radiator conductor.

6. The cited pertinent prior arts are listed below:

   A. US 6,421,016 B1, July 2002, Phillips et al. discloses antenna system having the first and second conductors 104, 108 inside the portable communication device (figure in cover page, abstract, summary of invention).

   B. US 4,868,576, September 1989, Johnson, Jr. discloses an extendable antenna with ground radiator 302 on the flexible circuit board 310 (figure in cover page, abstract, col. 3, line 60 to col. 4, line 6).

   C. US 5,337,061, August 1994, Pye t al. discloses high performance antenna having ground conductor 5 located in the flap 2(figure in cover page, abstract; col. 2, lines 39-57).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Chow whose telephone number is (703)-306-5615.
   If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Hunter, can be reached at (703)-308-6732.
   Any response to this action should be mailed to:

   Commissioner of Patents and Trademarks

   Washington, D.C. 20231

   or faxed to: (703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Charles Chow

February 19, 2003.